WHAT IS CLAIMED IS:

1. A device for detecting three-dimensional shapes of an elongated flexible body, comprising:

a sensor cable adapted to be inserted into an axial coextensive passage within an elongated flexible body, said sensor cable having two pairs of fiber Bragg grating strands each having a plural number of refractive index change portions periodically in a predetermined pitch;

a light source connectible to each one of said fiber Bragg grating strands to input a light beam containing a Bragg wavelength to said refractive index change portions; and

a signal processor adapted to receive reflection diffraction light signals from said refractive index change portions of each fiber Bragg grating strand, and to detect a three-dimensional shape of said elongated flexible body by measuring degree of straining at each one of said refractive index change portions by way of comparison of said reflection diffraction light signals with a reference wavelength.

2. A device for detecting three-dimensional shapes as defined in claim 1, wherein said pairs of fiber Bragg grating strands are

accommodated in a round tubular carrier casing and located on two perpendicularly intersecting axes and at positions on or close to inner periphery of said round tubular casing.

3. A device for detecting three-dimensional shapes as defined in claim 2, wherein said refractive index change portions in each one of said fiber Bragg grating strands are formed substantially at same positions in axial direction.

4. A device for detecting three-dimensional shapes as defined in claim 2, wherein said sensor cable is adapted to be placed in a biopsy channel extending through an insertion tube of an endoscope.

5. A device for detecting three-dimensional shapes as defined in claim 1, wherein said light source is arranged to emit a signal light in a predetermined wavelength band, and said refractive index change portions in each one of said fiber Bragg grating strands are adapted to generate reflection diffraction light signals with respect to different Bragg wavelengths, and said signal processor is adapted to detect

strains in said refractive index change portions on the basis of a shift of each reflection diffraction light signal from a reference wavelength.

6. A device for detecting three-dimensional shapes as defined in claim 1, wherein said light source is of a low coherence light beam, said refractive index change portions in each one of said fiber Bragg grating strands are adapted to generate reflection diffraction light signals with respect to the same Bragg wavelength, and said signal processor further includes an interferometer to check for interference between reflection diffraction light signal from each one of said refractive index change portions and reference light, detecting strains in said refractive index change portions on the basis of intensity of interference light.